Appendix A: Program Description and Schedule

iINVENT is a five-day project-based learning invention camp that runs Monday through Thursday, 9 a.m.–4 p.m., with a 3 p.m. end time on Friday.

Learning Outcomes

1. Students will learn about Invention as related to Human-Centered Design (HCD).
2. Students will learn the stages of HCD (Empathize, Define, Ideate, Prototype, and Test).
3. Students will gain skills related to empathizing with a "user," defining problems, brainstorming solutions, prototyping designs, and testing the product to see if it address the user's needs.
4. Students will engage in an invention project, to support student awareness, motivation, confidence, success, and self-efficacy toward inventing.

Themes

Each day of the camp has a separate theme. Each theme ties to one stage of the invention cycle, and as students progress through the cycle, they gain skills and insights into the intricacies of inventing. The themes are developed from Empathize, Define, Ideate, Prototype, and Test.

Morning/Afternoons

The morning of each day is designed to support team building, target skills, and activities related to the theme of the day. The afternoons are dedicated to a weeklong project-based learning challenge where the students engage in a human-centered invention project. This design is structured so that students spend the morning learning skills related to the theme of the day, and then they apply these skills to their invention project in the afternoon.

Teams

Students will work in groups of three to five for the invention project, but preferably four depending on the number of students at each camp. The students will work on the same team each day for the afternoon invention project but can work with other groups of students during the mornings.

Instructors

Four instructors run each camp. The instructors facilitate the camp and work closely with one to two teams to guide their invention projects. The projects are designed so that students are designing inventions for their college mentors; therefore, the instructors are not only the mentors of the projects but also the target audience for their invention.

Reflection

An important part of the invention process is to have students reflect on their design, process, creativity, and teamwork. Reflection is used as a key time for students to closely examine the process, and track their learning experiences at camp. Every camp session ends with a reflection activity that makes explicit connections to the theme of the day and the broader invention process. Additionally, students will record project logs in their invention groups to reflect on their invention process.

Camp Activities & Sample Schedule

Students will engage in a variety of STEM-related activities at camp to help students learn HCD. The camp activities include a college panel, Edison Robots, K'NEX cars, windmills, IPads & videography, creativity games, team building, and a "how to market an invention" video project.

Monday	Tuesday	Wednesday	Thursday	Friday
Theme: Empathize	**Theme: Define**	**Theme: Ideate**	**Theme: Prototype**	**Theme: Test**
8:30 a.m.–9:00 a.m. Student Drop-off/Mentor Arrival	8:30 a.m.–9:00 a.m. Student Drop-off/Mentor Arrival	8:30 a.m.–9:00 a.m. Student Drop-off/Mentor Arrival	8:30 a.m.–9:00 a.m. Student Drop-off/Mentor Arrival	8:30 a.m.–9:00 a.m. Student Drop-off/Mentor Arrival
9:00 a.m. Start	**9:00 a.m. Start**	**9:00 a.m. Start**	**9:00 a.m. Start**	**9:00 a.m. Start**
Camp Introduction *Pre-survey after camp opening	**Build a Boa**t *students participate in a 1hr RCRV design challenge	**Build a Better Paper Clip** *students participate in a 1hr Invention design challenge	**Mission Submersible** *students participate in a 1hr RCRV design challenge	**Random Gadget/Grab Bag Infomercial** *students participate in a design challenge that results in an infomercial skit
Marshmallow Challenge *students participate in a 1hr design warm-up	**Windmills** *students participate in a renewable energy design challenge to create the most efficient windmill blades.	**Improv Games/Zoom** *students practice creative thinking and idea generation skills.	**Video Intro/Diapers** *students practice ways of selling their invention and how to film an invention video.	**Invention Video** *students work in invention groups to finish their invention and video (this time can be filled with additional activities)
Design a Name Tag *students create a creative name tag	**College Panel Cont.** *****Opportunity to ask questions and learn about college life	**Solar K'NEX Cars** *students design vinegar and baking soda cars and can further design them to be solar powered (this activity takes place over two days)	**Storyboarding Video** *students work in invention groups to outline their invention and video (this time can be filled with additional activities).	
Empathy	**Vinegar K'NEX Cars**		**Spinners**	**Invention Video**

*students learn what empathy is and how to use it to inform their inventions	*students design vinegar and baking soda cars and can further design them to be solar powered (this activity takes place over two days)		*students learn how prototyping supports their invention by creating autonomous drawing robots	*students work in invention groups to finish their invention and video (this time can be filled with additional activities) *Post-survey before lunch
12–1 p.m. Lunch	12–1 p.m. Lunch	12–1 p.m. Lunch	12–1 p.m. Lunch	12–1 p.m. Lunch
College Panel *****opportunity to learn about users life and to ask questions about college life	**Invention Groups** *students are assigned or choose groups and set up community agreements and record their first project video describing their user and how their invention helps them	**Invention Groups** *students work in invention groups to brainstorm possible inventions using the "SCAMPER" technique. Students create a video log to record their progress	**Invention Groups** *students work in invention groups to create/revise a prototype for their user audience	**Inventor Showcase!** *students work in invention groups to finish their infomercial video to present at the **2 p.m.** Inventor Showcase. Parents/Guests are welcome to attend!
Edison Robots / Barcoding / Mini Golf / Mazes / Sumo Wrestling / Music and Dance Off *students program Edison Robots to navigate obstacle courses (this activity is for students to cycle through in the afternoons to break up the invention project).				
Design a Backpack *students create a backpack to fit the needs of a friend	**Team Tubes** *students to team building and community agreements to start working on their project.	**Project/Fun** *students can participate in supplementary activities or continue working on their invention	**Storyboarding Video (cont.)** *students work in invention groups to outline their infomercial and record a video log	**Pick Up 3 p.m.**
Pick Up 4 p.m.	**Pick Up 4 p.m.**	**Pick Up 4 p.m.**	**Pick Up 4 p.m.**	